

Walk Assessment Lynn, MA

October 20, 2014

Massachusetts Department of Transportation
Bicycle and Pedestrian Safety Program

in partnership with Massachusetts Department of Public Health

MAKING MASSACHUSETTS MORE WALKABLE

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Report Scope and Purpose

WalkBoston conducted this walk assessment as part of the Massachusetts Department of Transportation Bicycle and Pedestrian Safety Program, in association with the Massachusetts Department of Public Health. WalkBoston is a pedestrian advocacy organization whose mission is to make walking safer and easier in Massachusetts to encourage better health, a cleaner environment and vibrant communities. The purpose of the walk assessment is to develop knowledge and awareness of the pedestrian environment at the state and municipal level.

This walk assessment report summarizes the observations made along the walk route and makes recommendations for improvements to the built environment. The observations vary from specific infrastructure deficits (e.g., faded crosswalk, uneven sidewalk) to general comments on traffic speeds or land use patterns (e.g., vacant storefronts). Likewise, the recommendations range from individual fixes (e.g., paint the crosswalk) to suggestions for further study (e.g., evaluate the feasibility of installing raised crosswalks). The assessment is not meant to be a complete inventory of infrastructure deficiencies, nor is it meant to provide specific designs for improvement.

WalkBoston leads these assessments as a means to build local capacity for improving the built environment for walking and not as a complete inventory of walking conditions. WalkBoston staff members are not licensed design or engineering professionals. This report may be used as a resource for municipal staff and for design professionals who may be engaged by municipalities to program and design infrastructure improvements.

Lynn Walk Assessment

The City of Lynn is one of twelve communities participating in the Massachusetts Department of Transportation's (MassDOT's) multi-disciplined program to improve bicycle and pedestrian safety in Massachusetts. One component of the MassDOT program is to conduct walk assessments. The assessments have three goals:

1. Foster an awareness of the infrastructure elements which contribute to the walking environment
2. Evaluate the safety and quality of the walking environment along the route
3. Recommend infrastructure improvements

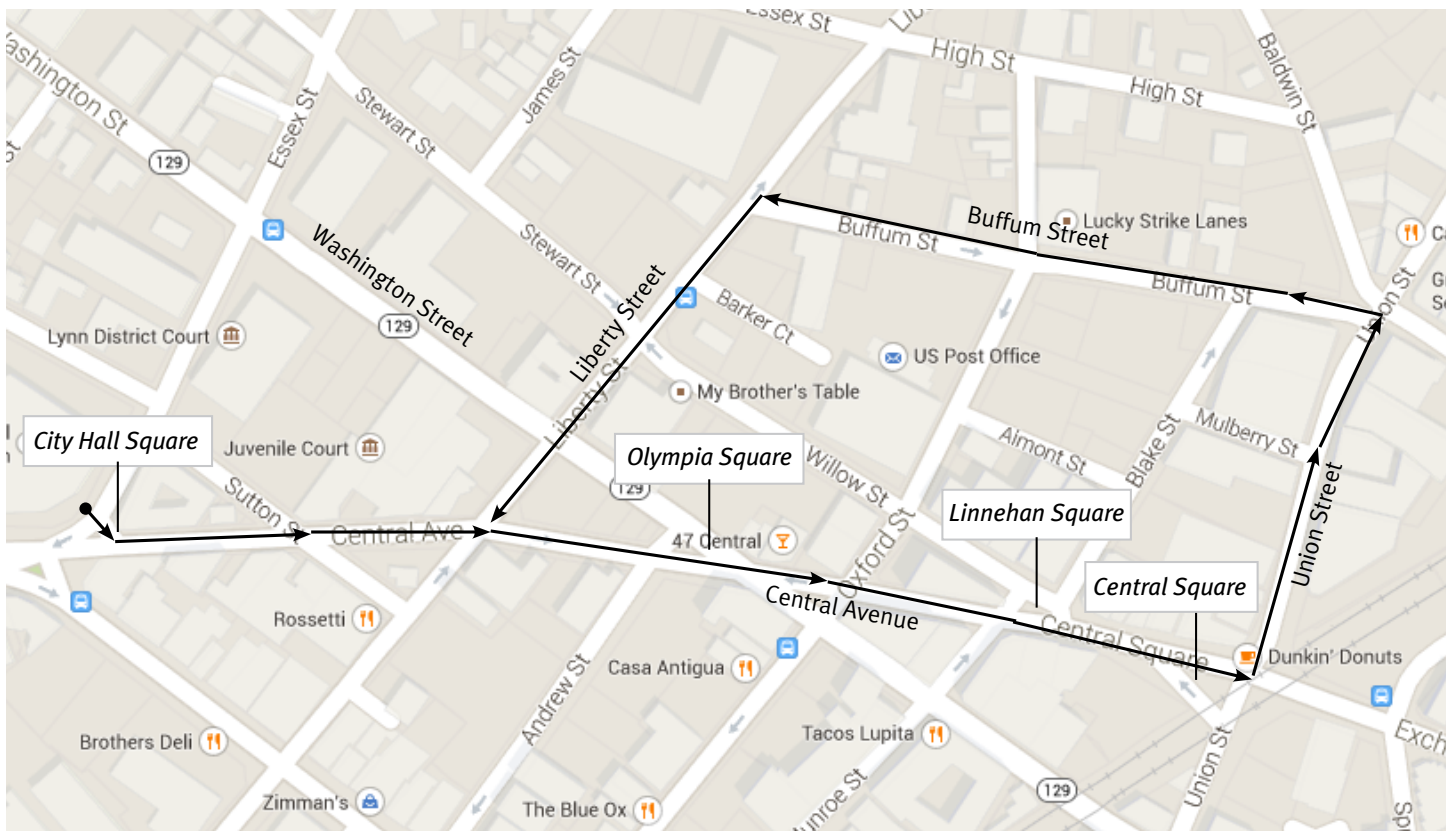
The City of Lynn identified several high-priority intersections that are particularly dangerous for pedestrians and cyclists. With input from the Mass in Motion program, City officials and the Lynn Police Department, WalkBoston established a walking route that incorporated a section of downtown Lynn including City Hall, the courthouse, Central Square, Lynn Community Health Center, and the Greater Lynn Senior Center. This area sees high volumes of pedestrians conducting business at the courthouse and City Hall, visiting local retail establishments and restaurants, and utilizing the many social service agencies in this district.

The walk assessment was conducted in Lynn on October 20, 2014, from 10:00 to 12:00 pm. The weather was clear with temperatures in the high 50s.

Study Area

The walk assessment focused on the Central Avenue corridor and the many intersections along it; from City Hall Square to Olympia Square, Linnehan Square, and Central Square where the MBTA commuter rail line runs east-west through the City. Central Avenue cuts diagonally through the City creating many irregularly, odd-shaped intersections which are difficult to navigate for all road users. City Hall Square (Essex Street and Central Avenue) is designated as a top five percent high crash cluster for both bicycle and pedestrian-related crashes in the Boston region. Washington Street, identified as an enforcement/awareness corridor for the Lynn Police Department, is also within the study area.

The route turned north onto Union Street to Freeman Square and then returned to City Hall Square along Buffum and Liberty Streets. The detailed analysis in this report covers the route from City Hall Square to Central Square and along Union Street to Freeman Square.



Map of Lynn walk assessment route

Overall Conditions/Observations of the Walk Assessment Route

Participants made the following observations about the overall conditions along the walking route:

- Traffic signal equipment at most intersections is antiquated
- Pavement markings are worn
- Sightlines are difficult for all road users due to parked cars, building edges, and irregular geometries at intersections
- Most marked crossings are not ADA-compliant; missing both curb ramps and detectable warning strips
- Pedestrians use medians as pedestrian refuge islands – “island hopping”; medians were not designed with this use in mind
- Pedestrians do not pay attention to signals; walk across streets when and where it is most convenient for them

Specific Observations and Recommendations for Locations along the Route

Central Avenue Corridor

As in many Massachusetts cities and towns, the Lynn road network is not laid out on a grid with intersections at right angles and block sizes in a regular pattern. Central Avenue cuts diagonally through downtown Lynn forming irregularly shaped intersection geometries with limited sight lines and complicated turning movements.

Central Avenue begins at City Hall Square as a two-lane street with parking on both sides with one-way eastbound traffic until it reaches Olympia Square. At Olympia Square, all eastbound traffic is diverted to Washington Street. Central Avenue carries westbound traffic from Central Square to Olympia Square where it is also diverted to Washington Street. The complicated driving patterns necessitate the slip lanes and traffic islands to help manage turning movements. These additional driving lanes chop up the pedestrian environment and make pedestrians more vulnerable as they maneuver through multiple street crossings.

Current infrastructure deficiencies:

- Complicated traffic patterns and irregular intersection geometries compromise the safety and quality of the pedestrian environment as walkers are forced to cross additional drive lanes and use crossings with jeopardized sight lines
- Wide travel lanes promote higher traffic speeds

Recommendations:

- Evaluate traffic directional patterns on Central Avenue and throughout the city to maximize pedestrian safety while maintaining reasonable traffic flows and limiting vehicular back-ups
- Use pavement markings to narrow travel lanes; paint parking lanes or edge lines

Intersections and Squares

City Hall Square: Essex Street/North and South Common Streets/Central Avenue/Market Street

City Hall Square is a hub of activity for all transportation modes. Crosswalks in City Hall Square lead to a pedestrian refuge island between Essex Street and Central Avenue. The pedestrian traffic signal has an exclusive pedestrian phase that is pedestrian-activated with push buttons. Given the complicated traffic patterns, the only other pedestrian crossings running north-south through the Square are on its west side near the Lynn Public Library.



Aerial view of City Hall Square

Current infrastructure deficiencies:

- Multiple approaches to City Hall Square require drivers to focus on travel lanes instead of looking for pedestrians
- Signal timing has an exclusive pedestrian phase activated by push buttons; pedestrians are not complying with signal
- Pedestrian traffic signal is misaligned; potentially struck by bus or truck
- Pavement markings are worn

Recommendations:

- Evaluate traffic patterns in and around City Hall Square for ways to improve pedestrian safety
- Consider a concurrent phase pedestrian traffic signal with a leading pedestrian indicator; one-way traffic patterns should make concurrent phase possible
- Repair pedestrian traffic signal so that it faces the pedestrians using it
- Repaint crosswalks and stop lines



Misaligned pedestrian signal at City Hall Square

Central Avenue and Sutton Street

Sutton Street sees significant pedestrian traffic between the parking lot on Liberty Street and the district courthouse. There are coffee shops and restaurants along the street. The streetscape is well-maintained with smooth sidewalks and trees.

Current infrastructure deficiencies:

- Wide travel lanes for one-way traffic; fast-moving traffic with compromised visibility given intersection geometries
- No crosswalks at Sutton Street and Central Avenue; neither across Sutton or Central
- Southwestern corner of Sutton and Central Avenue has wide driveway and service area with a depressed curb; cars often parked on sidewalk
- Parked cars on Central Avenue limit visibility of pedestrians trying to cross the street
- Missing curb ramps and detectable warning strips

Recommendations:

- Use paint to narrow travel lanes and slow traffic
- Evaluate the safety implications of marking a crosswalk across Central Avenue at Sutton Street; paint crosswalk across Sutton Street at Central Avenue
- Work with business owner on southwest corner to delineate walking zone from parking zone at Central and Sutton
- Consider removing parking at southwest corner of Sutton/Central to increase pedestrian visibility
- Install ADA-compliant curb ramps and detectable warning strips



Complicated pedestrian crosswalk at City Hall Square



Faded crosswalks near the courthouse on Liberty Street

Central Avenue and Liberty Street

Current infrastructure deficiencies:

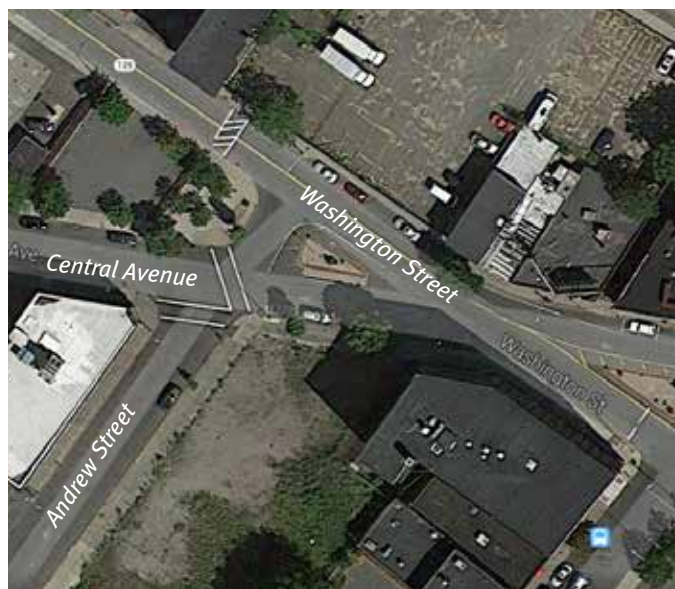
- Diagonal crosswalks follow pedestrian desire lines, but create long crossing distances
- ADA-compliant curb ramps and detectable warning strips were installed tangent to the curve on Central Avenue at Liberty, but there is no crosswalk connecting the ramps; parked cars block ramps
- Curb radius on northeastern corner seems excessive given traffic is one-way in an eastward direction

Recommendations:

- Consider elimination of diagonal crosswalk across Central Avenue
- Paint crosswalk between curb ramps on Central Avenue and limit parking within 20' of crosswalk
- Reduce curb radius on northeast corner of Central/Liberty Street intersection to shorten crossing distance

Olympia Square: Central Avenue and Washington Street (Oxford and Andrew Streets)

Central Avenue and Washington Street cross diagonally to form Olympia Square. Andrew Street and Oxford Street form the eastern and western edges of the square respectively and carry one-way traffic to the southwest of the square. The geometries complicate movements for all road users and create blind spots that could jeopardize pedestrian safety.



Aerial view of Olympia Square

Current infrastructure deficiencies:

- Diagonal crosswalk on Central Avenue puts pedestrian in the center of complicated turning movements around traffic island
- Crosswalk pavement markings are minimal and faded
- No stop line at traffic island for traffic turning from Washington Street south onto Andrew Street and the stop sign may not be visible to eastbound drivers
- Pedestrian traffic signals not functioning at intersection of Oxford and Central Ave
- Flashing yellow and red traffic signals at Oxford/Central are ineffective in providing protected pedestrian crossing and in mitigating speeds; no protected crossing for pedestrians
- Missing detectable warning strips and curb ramps (at Oxford and Central)
- Island hopping is prevalent in Olympia Square
- Senior citizen crossing sign posted with no crosswalk



Minimal pedestrian crosswalk markings in Olympia Square

Recommendations:

- Remove diagonal crosswalk and relocate along Central Avenue before intersection with Andrew Street
- Paint crosswalks leading to and from traffic island between Washington Street and Central Avenue just east of the Andrew Street intersection
- Paint stop bar with a STOP legend on the pavement and add stop sign to the left side to increase compliance with stop sign
- Repair or replace pedestrian traffic signal at Oxford and Central Avenue
- Consider adding a pedestrian push button-activated pedestrian phase to flashing traffic signal at Oxford/Central to provide a protected crossing phase
- Install ADA-compliant curb ramps and detectable warning strips
- Do a comprehensive review of pedestrian crossings and desire lines
- Evaluate location of senior crossing sign and either remove it or add a crosswalk



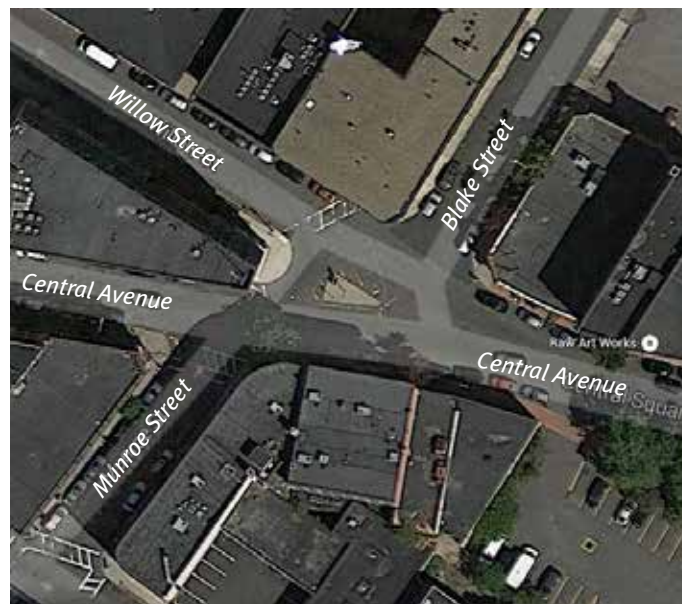
Broken pedestrian signal and faded crosswalks in Olympia Square



Unprotected pedestrian crossing on Oxford Street

Linnehan Square: Central Avenue, Willow Street, Blake Street, Munroe Street

Linnehan Square is on the walking route for people coming from south of Central Avenue to the Lynn Community Health Center on Union Street between Buffum Street and Mulberry Street. People cross to the island in the center of the square and wait for gaps in traffic to cross.



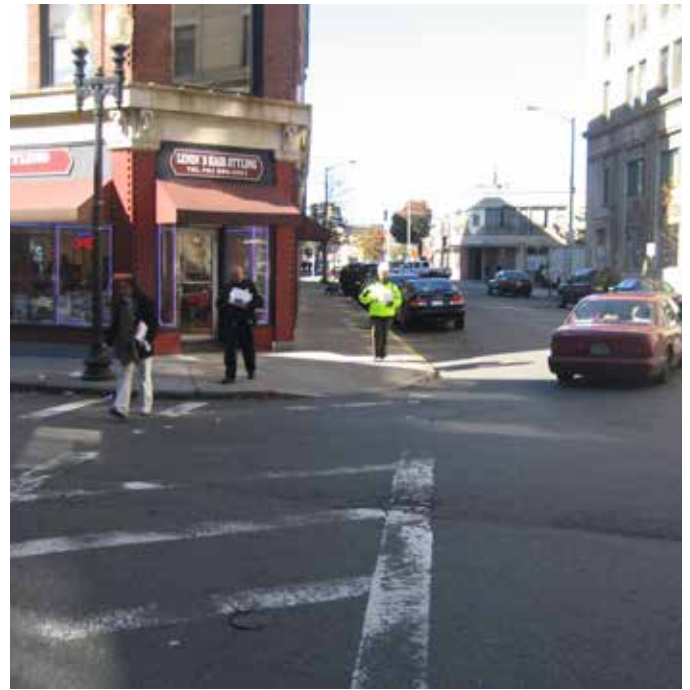
Aerial view of Linnehan Square

Current infrastructure deficiencies:

- Crosswalks do not follow pedestrian desire lines; no protected crossings in Linnehan Square
- No marked crosswalk across Central Avenue; the closest crosswalks are at Central and Oxford or near the MBTA tracks in Central Square
- Pavement markings are faded
- Motorists cut through Linnehan Square from Monroe Street, traveling the wrong direction on Willow Street, before turning north onto Blake Street (observed this multiple times in the short span we stood at the Square); left hand turn only sign on island is ineffective
- No “yield to pedestrian” signs
- Missing curb ramps and detectable warning strips at some crossings and corners

Recommendations:

- Evaluate location of existing crosswalks based on pedestrian desire lines and legal vehicular traffic movements; paint or repaint crosswalks as necessary
- Upgrade traffic island and/or install bump-outs to shorten crossing distances and make pedestrians more visible and movements more predictable in the square; ADA-compliant curb ramps and detectable warning strips may be needed
- Review street network and traffic flows (one-way vs. two-way) to determine if vehicular cut-through behavior can be modified
- Consider installing “yield to pedestrian” signs and in-street pedestrian signs at marked crossings
- Repair or replace curb ramps and detectable warning strips where needed



Intersection of Monroe and Central Streets in Linnehan Square

Central Square: Union Street and Central Avenue

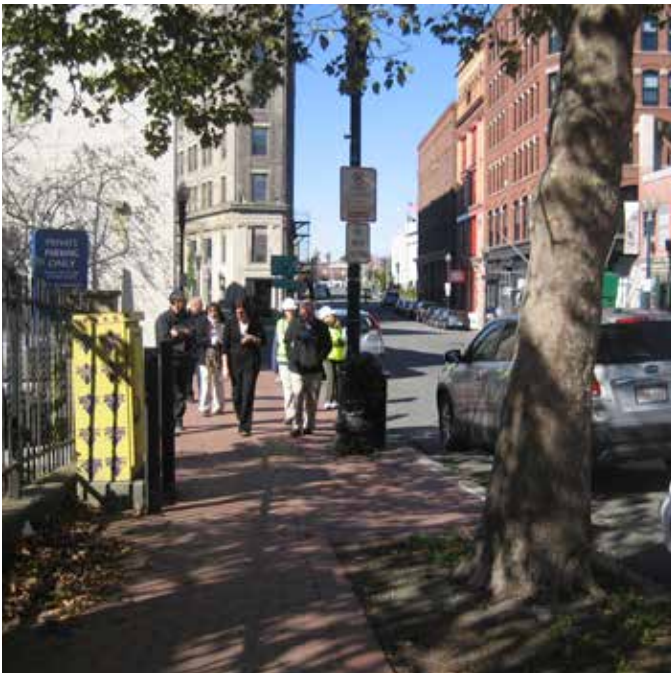
Central Square has seen recent infrastructure improvements including trees, smooth brick sidewalks, historic pedestrian scale lighting and a clock in the island at the square’s center. The MBTA commuter line spans the square and murals have been painted underneath the overpass. The downtown Farmer’s Market occupies a parking lot on the east side of Union Street, and bus shelters provide cover for transit riders at this major bus stop.



Faded crosswalk in Linnehan Square



Aerial view of Central Square



Central Square streetscape

Current infrastructure deficiencies:

- Pedestrians crossing mid-block on Central Avenue where left turn lane from Union Street intersects Central Avenue have no marked crosswalk
- Crosswalks near the train overpass are often in shadow which makes it difficult to see pedestrians
- No “yield to pedestrian” signage or roadside pedestrian crossing signs
- Crosswalk across left turn lane from northbound traffic on Union Street leading westbound on Central Avenue is on the curve and difficult to see; motorists drive quickly around this curve and have difficulty seeing pedestrians in the crosswalk; on-street parking on Union Street contributes to visibility issues
- Lighting under the overpass is minimal
- Curb ramps are missing detectable warning strips



Limited lighting under overpass

Recommendations:

- Evaluate the safety of painting a mid-block crosswalk across Central Avenue between Linnehan Square and Central Square; if crosswalk is painted, use ladder or continental design and consider using an in-street pedestrian crossing sign and installing curb extensions
- Consider installing additional “yield to pedestrian” signs, roadside pedestrian crossing signs and/or in-street pedestrian signs to help alert drivers to presence of crosswalks
- Consider removing on-street parking along Union Street nearest to the curve to improve motorists’ visibility of pedestrians
- Evaluate light conditions under overpass at night and install lighting to improve visibility for drivers and pedestrians
- Install detectable warning strips



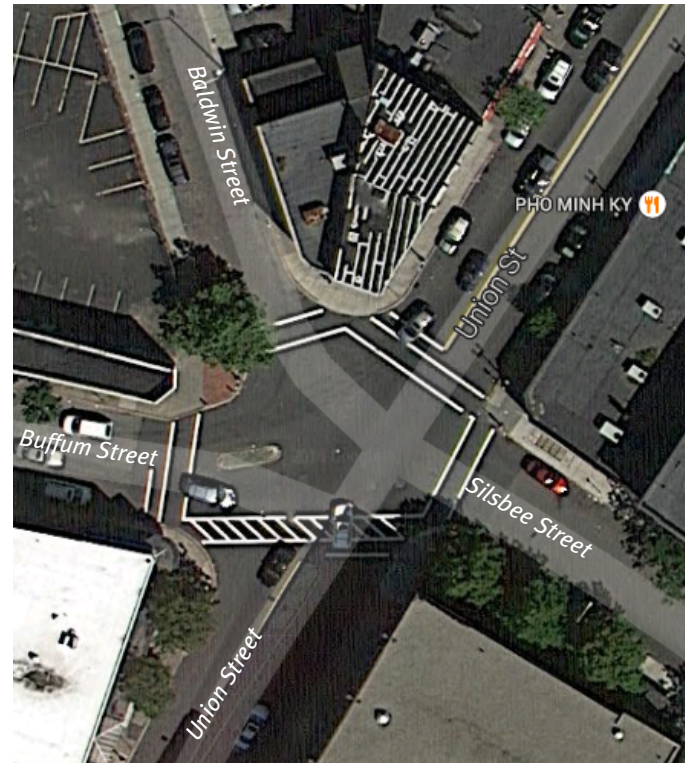
Crosswalk in shadow of overpass

Union Street Corridor between Central Avenue and Buffum Street

Sidewalks are smooth, wide and well-maintained on this section of Union Street. The Lynn Community Health Center, Greater Lynn Senior Center and other social service agencies generate a lot of pedestrians in this section of the city. An un-signalized, marked crossing at the intersection of Mulberry Street and Union Street provides the only marked crosswalk between Central Square and Freeman Square.



Improved streetscape at intersection of Union Street and Central Avenue



Aerial view of Freeman Square

Current infrastructure deficiencies:

- Missing curb ramps and detectable warning strips at un-signalized marked crosswalk on Union Street

Recommendations:

- Install curb ramps and detectable warning strips at un-signalized marked crosswalk on Union Street
- Consider installing curb bump-outs to shorten the crossing distance
- Place an in-street pedestrian crossing sign in the crosswalk to increase its visibility to motorists

Freeman Square: Buffum Street/Union Street/ Baldwin Street

Freeman Square is confusing for all road users: motorist, cyclists and pedestrians. The intersection is un-signalized with five different approaches. Union Street is the predominant traffic movement with 2-way traffic moving through the square. Baldwin Street and Silsbee Street carry traffic away from square. Traffic moves in both directions on Buffum Street.

Traffic islands divide lanes on both Buffum and Union Street which motorists use as cover when pulling into the square and oncoming traffic. Building edges further limit visibility and it is unclear who has the right-of-way. Pedestrians are often caught in the middle of these unpredictable turning movements.

Current infrastructure deficiencies:

- Crossing distances are long across Union Street
- Crosswalks have minimal pavement markings (except for one painted using the ladder design)
- Travel lanes seem wide on all approaches; few pavement markings to define roadways
- Traffic islands from previous street configurations do not effectively manage motorists or provide refuge for pedestrians



Missing curb ramp at the crosswalk on Union Street



Small traffic island in Freeman Square



Long crossing distance across Union Street in Freeman Square

Recommendations:

- Evaluate the location of marked crosswalks; install curb bump-outs to shorten crossing distances
- Paint crosswalks with ladder or continental crosswalk designs
- Use pavement markings to define travel lanes and parking lanes
- Study Freeman Square traffic patterns and redesign square with appropriate pedestrian refuge islands and traffic medians that clarify traffic movements, protect pedestrians at street crossings and improve functionality of vehicular traffic flow

Appendix A. Summary of Issues and Recommendations

Central Avenue Corridor

ISSUE	RECOMMENDATION	TIMEFRAME	RESPONSIBLE PARTY
Complicated traffic patterns and irregular intersection geometries compromise the safety and quality of the pedestrian environment; walkers cross additional drive lanes and use crossings with limited sight lines	Evaluate traffic directional patterns on Central Avenue and throughout the city to maximize pedestrian safety while maintaining reasonable traffic flows and limiting vehicular back-ups	Mid-term	City of Lynn
Wide travel lanes promote higher traffic speeds	Use pavement markings to narrow travel lanes; paint parking lanes or edge lines	Short-term	City of Lynn

City Hall Square: Essex Street/North and South Common Streets/Central Avenue/Market Street

ISSUE	RECOMMENDATION	TIMEFRAME	RESPONSIBLE PARTY
Multiple approaches to City Hall Square require drivers to focus on travel lanes instead of looking for pedestrians	Evaluate traffic patterns in and around City Hall Square for ways to improve pedestrian safety	Mid-term	City of Lynn
Signal timing has an exclusive pedestrian phase activated by push buttons	Consider a concurrent phase pedestrian traffic signal with a leading pedestrian indicator; one-way traffic patterns should make concurrent phase possible	Mid-term	City of Lynn
Pedestrian traffic signal is misaligned; potentially struck by bus or truck	Repair pedestrian traffic signal so that it faces the pedestrians using it	Short-term	City of Lynn
Pavement markings are worn	Repaint crosswalks and stop lines	Short-term	City of Lynn

Central Ave and Sutton Street

ISSUE	RECOMMENDATION	TIMEFRAME	RESPONSIBLE PARTY
Wide travel lanes for one-way traffic; fast-moving traffic with compromised visibility given intersection geometries	Use paint to narrow travel lanes and slow traffic	Short-term	City of Lynn
No crosswalks at Sutton Street and Central Avenue; neither across Sutton or Central	Evaluate the safety implications of marking a crosswalk across Central Avenue at Sutton Street; paint crosswalk across Sutton Street at Central Avenue	Mid-term	City of Lynn
Southwestern corner of Sutton and Central Avenue has wide driveway and service area with depressed curb; cars park on sidewalk	Work with business owner on southwest corner to delineate walking zone from parking zone at Central and Sutton	Short-term	City of Lynn
Parked cars on Central Avenue limit visibility of pedestrians trying to cross the street	Consider removing parking at southwest corner of Sutton/Central to increase pedestrian visibility	Short-term	City of Lynn
Missing curb ramps and detectable warning strips	Install ADA-compliant curb ramps and detectable warning strips	Mid-term	City of Lynn

Central Ave and Liberty Street

ISSUE	RECOMMENDATION	TIMEFRAME	RESPONSIBLE PARTY
Diagonal crosswalks follow pedestrian desire lines, but create long crossing distances	Consider elimination of diagonal crosswalk across Central Avenue	Short-term	City of Lynn
There is no crosswalk connecting the ramps on Central Avenue; parked cars block ramps	Paint crosswalk between curb ramps on Central Avenue and limit parking within 20' of crosswalk	Short-term	City of Lynn
Curb radius on northeastern corner seems excessive given traffic is one-way in an eastward direction	Reduce curb radius on northeast corner of Central/Liberty Street intersection to shorten crossing distance	Long-term	City of Lynn

Olympia Square: Central Avenue and Washington Street (Oxford and Andrew Streets)

ISSUE	RECOMMENDATION	TIMEFRAME	RESPONSIBLE PARTY
Diagonal crosswalk on Central Avenue puts pedestrian in the center of complicated turning movements around traffic island	Remove diagonal crosswalk and relocate along Central Avenue before intersection with Andrew Street	Short-term	City of Lynn
Crosswalk pavement markings are minimal and faded	Paint crosswalks leading to and from traffic island between Washington Street and Central Avenue just east of the Andrew Street intersection	Short-term	City of Lynn
No stop line at traffic island for traffic turning from Washington Street south onto Andrew Street and the stop sign may not be visible to eastbound drivers	Paint stop bar with a STOP legend on the pavement and add stop sign to the left sign to increase compliance with stop sign	Short-term	City of Lynn
Pedestrian traffic signals not functioning at intersection of Oxford and Central Ave	Repair or replace pedestrian traffic signal at Oxford and Central Avenue	Short-term	City of Lynn
Flashing yellow and red traffic signals at Oxford/Central do not provide protected pedestrian crossing	Consider adding a pedestrian push button-activated pedestrian phase to flashing traffic signal at Oxford/Central to provide a protected crossing phase	Long-term	City of Lynn
Missing detectable warning strips and curb ramps (at Oxford and Central)	Install ADA-compliant curb ramps and detectable warning strips	Mid-term	City of Lynn
Island hopping is prevalent in Olympia Square	Do a comprehensive review of pedestrian crossings and desire lines	Long-term	City of Lynn
Senior citizen crossing sign posted with no crosswalk	Evaluate location of senior crossing sign and either remove it or add a crosswalk	Short-term	City of Lynn

Linnehan Square: Central Avenue, Willow Street, Blake Street, Munroe Street

ISSUE	RECOMMENDATION	TIMEFRAME	RESPONSIBLE PARTY
Crosswalks do not follow pedestrian desire lines; no protected crossings in Linnehan Square	Evaluate location of existing crosswalks based on pedestrian desire lines and legal vehicular traffic movements;	Long-term	City of Lynn
No marked crosswalk across Central Avenue	Upgrade traffic island and/or install bump-outs to shorten crossing distances and make pedestrians more visible and movements more predictable in the square; ADA-compliant curb ramps and detectable warning strips may be needed	Short-term	City of Lynn
Pavement markings are faded	Paint or repaint crosswalks as necessary	Short-term	City of Lynn
Motorists cut through Linnehan Square from Monroe Street, traveling the wrong direction on Willow Street, before turning north onto Blake Street ; left hand turn only sign on island is ineffective	Review street network and traffic flows (one-way vs. two-way) to determine if vehicular cut-through behavior can be modified	Long-term	City of Lynn
No “yield to pedestrian” signs	Consider installing “yield to pedestrian” signs and in-street pedestrian signs at marked crossings	Short-term	City of Lynn
Missing curb ramps and detectable warning strips at some crossings and corners	Repair or replace curb ramps and detectable warning strips where needed	Mid-term	City of Lynn

Central Square: Union Street and Central Avenue

ISSUE	RECOMMENDATION	TIMEFRAME	RESPONSIBLE PARTY
Pedestrians crossing mid-block on Central Avenue where left turn lane from Union Street northbound intersects Central Avenue have no marked crosswalk	Evaluate the safety of painting a mid-block crosswalk across Central Avenue between Linnehan Square and Central Square; if crosswalk is painted, use ladder or continental design and consider using an in-street pedestrian crossing sign and installing curb extensions	Mid-term	City of Lynn
Crosswalks near the train overpass are often in shadow which makes it difficult to see pedestrians	Consider using in-street pedestrian signs to help alert drivers to presence of crosswalks	Short-term	City of Lynn
No “yield to pedestrian” signage or roadside pedestrian crossing signs	Consider installing additional “yield to pedestrian” signs, roadside pedestrian crossing signs and/or in-street pedestrian signs to help alert drivers to presence of crosswalks	Short-term	City of Lynn
Crosswalk across left turn lane from northbound traffic on Union Street leading westbound on Central Avenue is on the curve and difficult to see; on-street parking on Union Street contributes to visibility issues	Consider removing on-street parking along Union Street nearest to the curve to improve motorists’ visibility of pedestrians; consider using an in-street pedestrian sign	Short-term	City of Lynn

Central Square: Union Street and Central Avenue (cont.)

ISSUE	RECOMMENDATION	TIMEFRAME	RESPONSIBLE PARTY
Lighting under the overpass is minimal	Evaluate light conditions under overpass at night and install lighting to improve visibility for drivers and pedestrians	Mid-term	City of Lynn
Curb ramps are missing detectable warning strips	Install detectable warning strips	Long-term	City of Lynn

Union Street Corridor between Central Avenue and Buffum Street

ISSUE	RECOMMENDATION	TIMEFRAME	RESPONSIBLE PARTY
Missing curb ramps and detectable warning strips at un-signalized marked crosswalk on Union Street	Install curb ramps and detectable warning strips at un-signalized marked crosswalk on Union Street; consider installing curb bump-outs to shorten the crossing distance; place an in-street pedestrian crossing sign in the crosswalk to increase its visibility to motorists	Mid-term	City of Lynn

Freeman Square: Buffum Street/Union Street/Baldwin Street

ISSUE	RECOMMENDATION	TIMEFRAME	RESPONSIBLE PARTY
Crossing distances are long across Union Street	Evaluate the location of marked crosswalks; install curb bump-outs to shorten crossing distances	Long-term	City of Lynn
Crosswalks have minimal pavement markings (except for one painted using the ladder design)	Paint crosswalks with ladder or continental crosswalk designs	Short-term	City of Lynn
Travel lanes seem wide on all approaches; few pavement markings to define roadways	Use pavement markings to define travel lanes and parking lanes	Short-term	City of Lynn
Traffic islands from previous street configurations do not effectively manage motorists or provide refuge for pedestrians	Study Freeman Square traffic patterns and redesign square with appropriate pedestrian refuge islands and traffic medians that clarify traffic movements, protect pedestrians at street crossings and improve functionality of vehicular traffic flow	Long-term	City of Lynn

Appendix B. Participant List

NAME	ORGANIZATION
Stacey Beuttell	WalkBoston
Christina Cannon	LPPA
Mary Fountain	Mayor's Office
Andrew Hall	Lynn Department of Public Works
Brendan Kearney	WalkBoston
MaryAnn O'Connor	Lynn Department of Public Health
Laura O'Rourke	WalkBoston
Robert Rao	Safe Routes to School
Lisa Schletzbaum	MassDOT Safety
Ned Shinnick	Lynn Police Department

Appendix C. Terminology

Below are images and definitions of the terms used to describe the walking environment in this report.

Crosswalk and Stop Line

Crosswalks can be painted in a variety of ways, some of which are more effective in warning drivers of pedestrians. Crosswalks are usually accompanied with stop lines. These lines act as the legally mandated stopping point for vehicles, and discourage drivers from stopping in the middle of the crosswalk.



Crosswalk patterns
Source: USFHA



Crosswalk and stop line
Source: http://safety.fhwa.dot.gov/ped_bike/tools_solve/ped_scdproj/sys_impact_rpt/images/fig16.jpg

Curb Ramp and Detectable Warning Strip

Curb ramps provide access from the sidewalk to the street for people using wheel chairs and strollers. They are most commonly found at intersections. While curb ramps have improved access for wheelchair-bound people, they are problematic for visually impaired people who use the curb as an indication of the side of the street. Detectable warning strips, a distinctive surface pattern of domes detectable by cane or underfoot, are now used to alert people with vision impairments of their approach to streets and hazardous drop-offs.



Curb ramp and detectable warning strip in Woburn, MA

Curb Extension/Curb Bulb-out

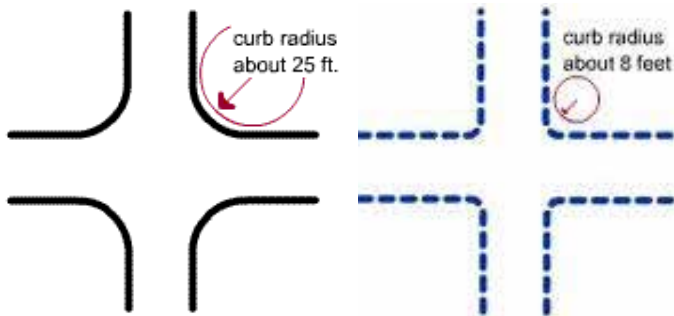
A sidewalk extension into the street (into the parking lane) shortens crossing distance, increases visibility for walkers and encourages eye contact between drivers and walkers.



Curb extensions are often associated with mid-block crossings

Curb Radius

A longer curb radius (on the left in figure below) allows vehicles to turn more quickly and creates longer crossing distance for pedestrians. A shorter curb radius (on the right in the figure below) slows turning speeds and provides pedestrians shorter crossing distances.



(A) Gravel-filled curb extension

There are two excellent examples of the shortening of curb radii in Woburn, MA. The first (A) is a low-cost solution using a gravel-filled zone between the original curb line and the newly established road edge. The second is a higher-cost solution using grass and trees and extending the sidewalks to the new curb. Both work to slow traffic.

Fog Line

A fog line is a solid white line painted along the roadside curb that defines the driving lane and narrows the driver's perspective. Fog lines are most often used in suburban and rural locations, but may be appropriate in some urban conditions.



(B) Grass, trees and extended sidewalk in curb extension



Fog lines delineate the vehicular driving zone on wide roadways.

In-street Pedestrian Crossing Sign

In-street pedestrian crossing signs are used at the road centerline within crosswalks to increase driver awareness of pedestrians in the area. These signs are a relatively low-cost, highly effective tool in slowing traffic by the narrowing travel lanes. They are popular with road maintenance departments since they can be easily moved for snow removal.



High-Intensity Activated crossWalk (HAWK)

A HAWK beacon (High-Intensity Activated crossWalk beacon) is a traffic signal used to stop road traffic and allow pedestrians to cross safely. It is officially known as a Pedestrian Hybrid Beacon (PHB). The purpose of a HAWK beacon is to allow protected pedestrian crossings, stopping road traffic only as needed. Where standard traffic signal 'warrants' prevent the installation of standard three-color traffic signals, the HAWK beacon provides an alternative.



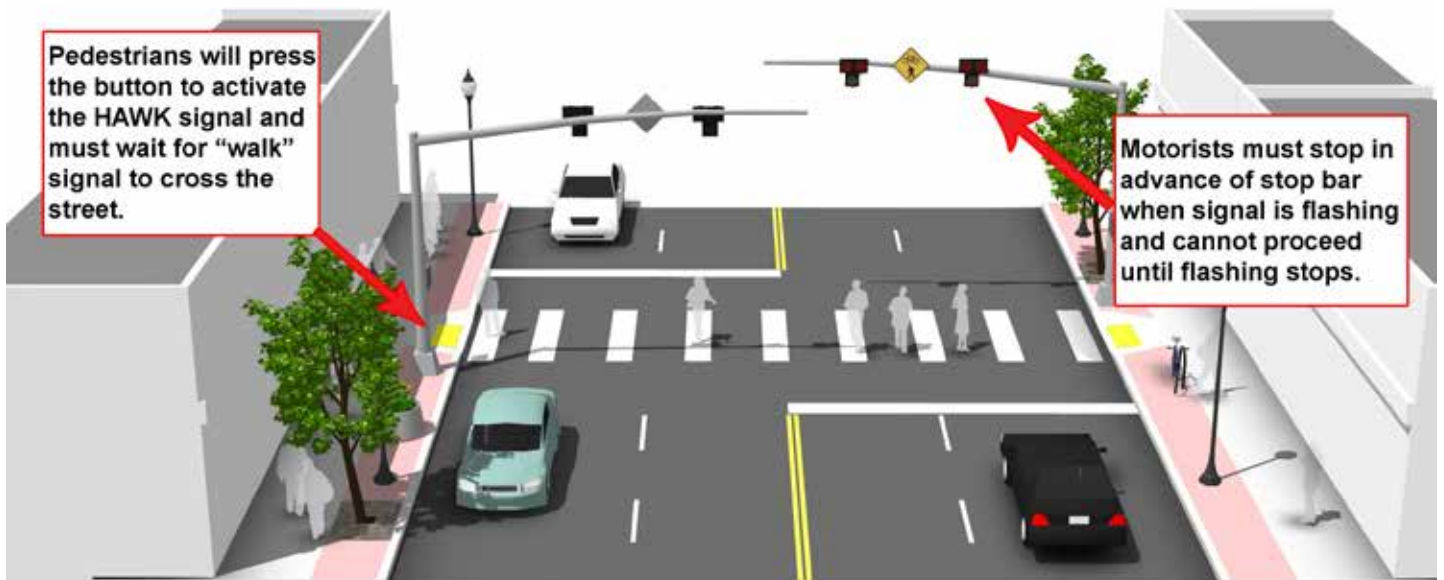
Source: <http://www.achdidaho.org/Projects/Images/NewHawkSignal092209%20014.jpg>

Leading Pedestrian Interval (LPI)

A leading pedestrian interval gives pedestrians an advance walk signal before motorists get a green signal, giving the pedestrian several seconds to start walking in the crosswalk before a concurrent signal is provided to vehicles. This makes pedestrians more visible to motorists and motorists more likely to yield to them. Typical LPI settings provide 3 to 6 seconds of advance walk time.



Source: http://safety.fhwa.dot.gov/ped_bike/tools_solve/ped_scdproj/sys_impact_rpt/images/fig34.jpg



Source: <http://bloomington.in.gov/media/media/image/jpeg/13144.jpg>

Pedestrian Refuge Island

Pedestrian refuge islands are protected areas where people may safely pause or wait while crossing a street. Pedestrian refuge islands are particularly helpful as resting areas for seniors, persons with disabilities, children, and others who may be less able to cross the street in one stage. At signalized intersections, they allow slow moving pedestrians to cross in two phases. At unsignalized locations, they simplify the act of finding a gap in traffic to cross since vehicles from only one direction must be reckoned with at a time.

<http://www.sfbetterstreets.org/find-project-types/pedestrian-safety-and-traffic-calming/traffic-calming-overview/medians-and-islands/>



Pedestrian refuge island at a signalized crossing
Source: <http://safety.fhwa.dot.gov/intersection/resources/fhwasao6o16/images/fig95.jpg>

Appendix D. Walk Assessment Tool



Street Name/Intersection	
Date/Time	
Weather Conditions	
Neighborhood Character	
<input type="radio"/> Land use: residential, commercial, industrial or mixed use?	
<input type="radio"/> Community facilities: schools, parks, libraries?	
<input type="radio"/> Surface parking lots?	
<input type="radio"/> Buildings occupied?	
<input type="radio"/> Building facades – blank walls, engaging storefronts, sidewalk cafes?	
<input type="radio"/> Is there street activity?	
Street Description	
<input type="radio"/> Arterial or local	
<input type="radio"/> Number and estimated width of travel lanes – narrow, adequate, wide?	
<input type="radio"/> Parking – none, one or both sides?	
<input type="radio"/> Sidewalks – none, one or both sides?	
Vehicular Traffic	
<input type="radio"/> Posted speed limit signs	
<input type="radio"/> Estimated vehicle speeds	
<input type="radio"/> Volume	
Sidewalks	
<input type="radio"/> On both sides of the street?	
<input type="radio"/> Wide? Continuous? Smooth surface?	
<input type="radio"/> Curb ramps/detectable warning strips?	
<input type="radio"/> Buffered from traffic with landscape strips (verge)?	
<input type="radio"/> Minimal number of interrupting driveways? Narrow or wide driveways?	
<input type="radio"/> Are newspaper racks, outdoor seating organized?	

Street furnishings	
<input type="radio"/> Trees?	
<input type="radio"/> Benches?	
<input type="radio"/> Trash receptacles?	
<input type="radio"/> Bicycle accommodations?	
<input type="radio"/> Lighting?	
Crosswalks	
<input type="radio"/> Condition?	
<input type="radio"/> Design: 2 lines, zebra/ladder, stamped, pavers? Raised?	
<input type="radio"/> Marked and signed?	
Traffic signals	
<input type="radio"/> Pedestrian-activated? Countdown signals?	
<input type="radio"/> Timing – enough time to cross? Traffic stops in all directions? Traffic stops only in lanes pedestrian is crossing?	
<input type="radio"/> Right turn on red prohibited?	
Sight lines/Visibility	
<input type="radio"/> Obstacles – vegetation, light poles, parked cars?	
<input type="radio"/> Road design – curves, elevation change?	
Pedestrian Safety Countermeasures	
<input type="radio"/> Curb extensions?	
<input type="radio"/> Pedestrian refuge islands or medians?	
<input type="radio"/> In-street pedestrian signs?	
<input type="radio"/> Speed tables?	
Accessibility	
<input type="radio"/> Curb ramps?	
<input type="radio"/> Detectable warning strips?	
<input type="radio"/> Slopes/cross-slopes?	